This listing of claims will replace all prior versions, and listings, of claims in the

application:

<u>Listing of Claims:</u>

1. (Currently amended)   A method of conducting motion correction for a tomographic scanner including a detector array for detecting radiation to generate detector data, wherein the method comprises:

storing detector data collected during a data acquisition period, said detector data being indicative of:

       i) directions along which radiation is detected; and

       ii) quantities of radiation detected in different of said directions;

storing movement data representing movement of the subject during the data acquisition period; and

motion correcting said detector data using said movement data and a motion correction algorithm to calculate motion corrected detector data,

wherein said motion correcting step comprises processing said detector data by:

       a) realigning directions of at least some of said detector data on the basis of said movement data; and

       b) altering quantities of at least some of said detector data on the basis of said movement data,

such that at least some of said detector data are both realigned and altered in quantity,

wherein said altering quantities step comprises calculating estimates of first detector data based on second, different, detector data<u>,</u>

<u>characterised in that said altering quantities step comprises either:</u>

<u>selecting whether to scale an original detected quantity of said first detector data upwards or to replace the original detected quantity of said first detector data with a said calculated estimate; or</u>

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altering the original detected quantity of said first detector data so that the altered quantity takes into account both the original detected quantity and a said calculated estimate.

2. (Original) A method according to claim 1, wherein said estimates are calculated using forward projection from said second detector data.

3. Canceled.

4. Canceled.

5. (Currently amended) A method according to claim ~~3~~1, wherein if the method comprises altering the original detected quantity quantity so that the altered quantity takes into account both the original detected quantity and a said calculated estimate, the method comprises ~~selectively utilizing a said calculated estimate or a said rescaled quantity~~ selecting a weighting between the original detected quantity and the calculated estimate to generate ~~a~~said altered quantity.

6. (Currently amended) A method according to claim 5, wherein said ~~selection~~selecting whether to scale or replace is performed on the basis of a threshold.

7. (Original) A method according to claim 6, wherein said threshold is variable.

8. (Previously presented) A method according to claim 6, wherein a value indicating an amount of scaling deemed appropriate for a quantity is determined, and the value is compared to the threshold in order to determine whether to scale the quantity upwards or to replace it with a calculated estimate.

9. (Previously presented) A method according to claim 1, further comprising performing image reconstruction using said motion corrected detector data.

10. (Currently amended)   A method according to claim 9, comprising performing image reconstruction using <u>one of</u> an analytic image reconstruction algorithm <u>and</u><s>and/or</s> an analytic rebinning algorithm.

11. (Original) A method according to claim 10, wherein said algorithm is one of 3DRP, FAVOR, BPF, FORE, FORE-X and FORE-J.

12. (Previously presented)   A method according to claim 1, wherein said scanner is a positron emission tomography (PET) scanner.

13. (Original) A method according to claim 12, wherein said detector data is 3D PET detector data.

14. (Currently amended)   Computer software <u>on a computer readable medium</u> for conducting motion correction for a tomographic scanner including a detector array for detecting radiation to generate detector data, wherein the software is configured to:

store detector data collected during a data acquisition period, said detector data being indicative of:

i) directions along which radiation is detected; and

ii) quantities of radiation detected in different of said directions;

store movement data representing movement of the subject during the data acquisition period; and

motion correct said detector data using said movement data and a motion correction algorithm to calculate motion corrected detector data,

wherein said motion correcting step comprises processing said detector data by:

a) realigning directions of at least some of said detector data on the basis of said movement data; and

b) altering quantities of at least some of said detector data on the basis of said movement data,

such that at least some of said detector data are both realigned and altered in quantity,

wherein said altering quantities step comprises calculating estimates of first detector data based on second, different, detector data,

characterised in that said altering quantities step comprises either:

selecting whether to scale an original detected quantity of said first detector data upwards or to replace the original detected quantity of said first detector data with a said calculated estimate; or

altering the original detected quantity of said first detector data so that the altered quantity takes into account both the original detected quantity and a said calculated estimate.

15. (Original)   A data carrier comprising computer software according claim 14.

16. (Currently amended)   A tomographic scanner system including a detector array for detecting radiation to generate detector data, wherein the scanner system is configured to:

store detector data collected during a data acquisition period, said detector data being indicative of:

      i) directions along which radiation is detected; and

      ii) quantities of radiation detected in different of said directions;

store movement data representing movement of the subject during the data acquisition period; and

motion correct said detector data using said movement data and a motion correction algorithm to calculate motion corrected detector data,

wherein said motion correcting step comprises processing said detector data by:

      a) realigning directions of at least some of said detector data on the basis of said movement data; and

      b) altering quantities of at least some of said detector data on the basis of said movement data,

such that at least some of said detector data are both realigned and altered in quantity,

wherein said altering quantities step comprises calculating estimates of first detector data based on second, different, detector data,

characterised in that said altering quantities step comprises either:

selecting whether to scale an original detected quantity of said first detector data upwards or to replace the original detected quantity of said first detector data with a said calculated estimate; or

altering the original detected quantity of said first detector data so that the altered quantity takes into account both the original detected quantity and a said calculated estimate.